

Climate Change and the City of Seattle's Water Supply

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Impact assessment on the effects of climate change and analysis techniques for incorporating climate change information into Seattle's long range water supply planning.

The preponderance of evidence in the scientific community supports the theory that global climate is changing. The effect of climate change on natural and man-made systems remains less certain. Municipal water supplies, particularly those that rely on summer snow-melt to augment storage capacity, are at risk of significant changes from the historic streamflow regime to which they have become accustomed. There are few standardized methods established for assessing the impacts of climate change to municipal water supplies. This study evaluates potential climate change impacts to the water supply system for the city of Seattle, Washington, using a three stage modeling approach: General Circulation Models (GCMs) to simulate global climate, basin scale hydrology models, and water resource system simulation models. Specific attention is given to the techniques necessary for downscaling climate data from the global scale to the basin scale and to the uncertainties associated with each step of the modeling sequence. The greatest source of uncertainty in the modeling process arises from the wide range of future scenarios produced by GCMs. This uncertainty is addressed by incorporating multiple climate models at every stage of the process and using the range of values produced to generate an ensemble average that quantifies the most likely impact. The ensemble average is bracketed by an uncertainty envelope based on the range and spread of the individual GCM ensemble members.